ALTERNATIVES FOR A REHABILITATION OF DAR ES SALAAM, DAR EL NAIM AND OLEIH

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P R E F A C E.

According to a request of the Ministry of Housing and Housing Utilities, a workshop was organized in Holland to study the different alternatives for a replanning of the squatter areas in the south-western port of PORT SUDAN.

A great number of advanced students (1) of the Urban Planning and Human Geography departments of different Universities participated in this workshop. The students were divided in teams; every team has presented their own contribution. In this report we try to present a general summary of the results of this seminar. This summary was prepared under my supervision by Mr. TITUS MEIJER, research assistant in our department.

Amsterdam, December 4th 1984.

COEN BEEKER,
Department of Urban Planning
University of Amsterdam.

(1) A list of the participants is joined in annex 1.
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pulation, increasing port activities, trade and industry. On the other hand Port Sudan has big areas within and outside her municipal boundaries which are liable to flooding due to occasional rain and surfacewater from the Red Sea Hills.

The consequences of the beforementioned unequal labour situations are substantial differences in income and social-political power. It's not surprising that already under British colonial rule which was characterised by large social-economic differences, a spatial system was developed which followed this same pattern of unequal distribution. This spatial system was based on Town planning regulations which in a somewhat modified form, still exist today and divide up the residential areas in four classes. These residential classes differ in plot size, the permanency of building materials, level of basic and public services and of course in price. In 1982 the price of a plot varied from 1800 £S. for a first class plot to 20 £S. for a fourth class plot. The applied Town planning regulations certainly try to achieve a spatial segregation of the population along social-economic lines, which also means differences in accessibility to urban facilities and services.

Besides these four official housing classes, extensive squatter-areas have developed as a consequence of population pressure and income inequality. The rise of squatter areas is a relatively old phenomenon. The first squatter area came into existence in 1950 (Deim Omna) and the growth of such areas in the sixties and seventies has been gigantic. In 1973 70,000 of a total of 130,000 people lived in squatter areas; that is 54%. The estimate for 1984 is about 30% of total Port Sudan's inhabitants (± 90,000). These squatter areas, of which some have been resettled in the period 1969-1975, have to contend with shortages of basic facilities (water, durable roads, sewerage etc.) and public services (schools, medical units, public transport etc.). An improvement of the existing situation certainly requires a lot of attention in the near future.

1.1. The present situation of the squatter areas in S.W. Port Sudan.

The South-West area of Port Sudan, between the airport and the ringroad, contains the three squatter areas Dar es Salam, Dar el Neim and Oleih (see map 1). These areas are not spatially planned in any way by the Municipality and the residents have spontaneously laid-out plots and built their houses by their own initiative. Very often they allowed family members to settle in the same area. Dar es Salam for example came into existence in 1950. Its location on the municipal boundary was very favourable because both the municipal and the regional authorities didn't take any action.

The present number of inhabitants in these three quarters is hardly clear. The existing reports show no signs of any agreement. The following table show these differences.

<table>
<thead>
<tr>
<th>Year</th>
<th>DAR ES SALAM</th>
<th>Dar el Neim</th>
<th>Oleih</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>households</td>
<td>households</td>
<td>households</td>
</tr>
<tr>
<td>BCEOM</td>
<td>5.900</td>
<td>3.800</td>
<td>1.100</td>
</tr>
<tr>
<td>E.R.A.</td>
<td>15.000</td>
<td>11.000</td>
<td>-</td>
</tr>
<tr>
<td>FUA</td>
<td>10.000</td>
<td>9.500</td>
<td>2.500</td>
</tr>
</tbody>
</table>

(1) - BCEOM (1984) figures are rounded off to 100.
- Euro Action Accord (1973)
- Free University of Amsterdam (1982)
BCEOM has based her figures on a survey among 1600 households in Port Sudan and a counting of houses based on available air-pictures.

E.A.A. has executed interviews in six quarters, including Dar-es-Salam and Dar el Neim. There estimation is also based on conversations with informal community leaders. The F.U.A. has also executed interviews in 1982 and 1983 in several quarters in which a total of 600 households were involved. The applied method consisted of interviews with households of selected dwelling blocks. An estimation of the actual number of households in the before-mentioned residential area remains a precarious undertaking. Based on the different estimates, personal impressions and conversations with community leaders, we assume that the following figures for 1-1-1984 are close to reality.

<table>
<thead>
<tr>
<th>Quarters</th>
<th>Households</th>
<th>Persons</th>
<th>Persons/household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dar es Salam</td>
<td>7,500</td>
<td>45,000</td>
<td></td>
</tr>
<tr>
<td>Dar es Neim</td>
<td>6,000</td>
<td>36,000</td>
<td></td>
</tr>
<tr>
<td>Oleih</td>
<td>1,500</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,000</strong></td>
<td><strong>90,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

The three quarters are physically surrounded by dry riverbeds and Dar es Salam and Oleih are also dissected by these. This explains the elongated form of Dar el Neim and Dar el Salam. The areas of Dar es Neim, Dar es Salam en Oleih are respectively 178, 147 and 18.65 hectare.

Dar es Neim is, from an ethnical standpoint, divided into two communities namely Dar es Neim proper (the North-eastern port) and Deim Habila (the south-western part). The Beni-amer is the biggest ethnic group and they dominate Deim Habila. The Nubas are the second largest group and they dominate Deim Habila. Dar es Neim proper further contains Beja, Southerners, Tahari (Fellata), Northerners and Halabi. Dar es Salam on the other hand contains Fellata, Bejas, Beni amer, Bagara and Northerners. Although on communitylevel different ethnic groups can be identified, on quarter- and dwelling-blocklevel, there is a clear preference for ethnic homogeneity. People with the same ethnic or religious background tend to cluster. The consequence of this behaviour is a certain social-economic mix of people within a dwelling block, which means that people with a different income live close to one another.

The level of these incomes and the differences between them is another debatable question. BCEOM gives an average income per household of 204 E.S per month for households living in squat-ter-areas and 273 E.S. for fourth class households. However, one has to keep in mind the fact that these numbers are averages, which means that the differences per residential class can be rather big. This especially counts for the squatter-areas. The number of working people per household are less for squat-ter-areas (1.2) than for the other residential areas which vary from 1.4 to 1.8 for 4th class to 2nd class areas. The main sources of income for households in squat-ter-areas are wage-work, daily work and self-employment in the informal (service) sector. The relative impor-
tance of these three forms of labour differs for the three squatter areas. In Dar es Neim wage-work is the main source of income in contrast with Dar es Salam and Oleih. This employment is located partly downtown and at the harbour (port activities, industry and services) and partly within the quarters themselves market activities, informal trade and industry).

Over the years the squatter areas have only been supplied with a few basic services. There is no electricity, no running water or sanitary facilities with the exception of a few pit-latrines. It's not surprising that garbage, human and animal waste pollute the narrow passes and cat-walks. Only in Deim Habila garbage collections has been organised. For water the residents have to depend on traders who bring water on donkey carts and on two public water taps at the school compound which operate not more than 90 minutes a day. The expenses for water amount to 20 or 25% of total income for people living in squatter areas, in contrast to 3% for people living in 3rd class residential areas.

The public facilities are only slightly better. There are some primary schools which teach only 10% of schoolage children, although a lot of children walk to other schools in town, especially Deim Korea. There are some more or less equipped clinics, which can hardly serve this population. Public transport in Port Sudan experiences some obstacles. The busses are old and demand a lot of maintenance. The roadnetwork is bad, specifically in the squatter-areas and recently planned 3rd and 4th class residential areas. Dar es Salam and Dar es Neim however do have a direct connection with the downtown areas. These busservices are supplemented by private lorries, but although people are able to move themselves, traveltimes still amount to 1½ to 2 hours a day. Public Transport is an important issue because of the dependency of people partly on the downtown area and harbour for services and employment and partly on their own residential area. Shopping mostly takes place on neighbourhood level.

The quality of housing is affected by the relatively low incomes of the households and the official illegal status of the areas, which means that building with durable materials is not very likely. The overwhelming majority of households nevertheless considers themselves to be the owner of their living-plot. The houses are mostly constructed with wood and all kinds of other packingmaterials (drums, sacks, plastic sheets etc.), and differ only in size, layout, used materials and durability.

An important point concerns the organisation of the residents of the squatter areas. There organisations are playing an important role in relation to the spatial restructuring of these areas. Seen from the perspective of resident-participation they are very important. The neighbourhood councils are a clear reflection of ethnic diversity in the different quarters, although not proportional. In Deim Habila the neighbourhood council consists mainly of Nuba. The main tasks of these councils are the distribution of basic commodities, land and license allocation. A parents' Association is looking into matters of education. The elected members of the municipal council generally take part in meetings of the neighbourhood councils.
In the case of spatial restructuring of the squatter areas, it's possible that some ethnic minorities are excluded to apply for a plot in the new restructured areas, because of political dominations of the main ethnic groups. The district councils namely fulfill an important role in the preparation of the decision-making in case of a spatial restructuring and allocation of plots.

The second workdocument of FUA and the urban development plan of BCEOM both provide some information about the preferences of the households in relation to social-economic and ethnic issues. In the case of the social-economic issue, there seems to be a preference for a homogeneous composition of households according to income. This is not in accordance with the existing situation in the squatter areas. Ethnically speaking, there is also a certain preference for a homogeneous composition, especially on dwelling blocklevel. The priorities for basic services in the squatter areas are as follows: public watertaps (23%), garbage collection (16%), public transport (14%) and electricity (12%). These priorities hardly vary between the quarters. The priorities for public services are: a policestation (19%), a clinic (16%), a secondary school (14%). These priorities also hardly vary between the quarters.

1.2. Analysis of the spatial needs of S.W. Port Sudan.

To assess the spatial needs of S.W. Port Sudan, we have to make an estimate of its population growth. If we take the before-mentioned figures of the total number of households of 15,000 for 1984 for S.W. Port Sudan and an annual growth of 6.5% (2), we have in 1985 circa 16,000 households and a total of circa 30,000 households in 1995.

The total area of S.W. Port Sudan amounts to circa 1400 hectare, that is including the three squatter areas and the technical school, but excluding the new approved residential extension (1st, 2nd and 3rd class) at the westside of the airport, El Mirgania and Deim and Inguab. The Riverbed Knor Mog is taken as the northern boundary of the area (see map 2). The area which is liable to flooding totals circa 600 hectare, that is 43% of the S.W. Port Sudan area! Partly, the S.W. area is already in use, namely:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>- the technical school</td>
<td>18,0 hect.</td>
</tr>
<tr>
<td>- agriculture near the station Asotriba</td>
<td>10,0 &quot;</td>
</tr>
<tr>
<td>- 4,8 km ringroad</td>
<td>19,2 &quot;</td>
</tr>
<tr>
<td>- 4,8 &quot; railway</td>
<td>9,6 &quot;</td>
</tr>
<tr>
<td>- two small industrial plots</td>
<td>4,5 &quot;</td>
</tr>
<tr>
<td>- the cementary</td>
<td>1,25 &quot;</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>62,55 hectares.</td>
</tr>
</tbody>
</table>

The three squatter areas Dar el Naim, Dar es Salaam and Oleih amount to 178, 149 and 18,65 hectare respectively (BCEOM 1983 section C, page 53).

The following table gives an impression of the present landuse of S.W. Port Sudan.
Present landuse in S.W. Port Sudan 1984.

<table>
<thead>
<tr>
<th></th>
<th>absolute</th>
<th>relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area S.W. Port Sudan</td>
<td>1413 hect</td>
<td>100%</td>
</tr>
<tr>
<td>area already destined</td>
<td>62,5</td>
<td>4,4%</td>
</tr>
<tr>
<td>continually flooded areas</td>
<td>605</td>
<td>43%</td>
</tr>
<tr>
<td>Dar el Naim</td>
<td>178</td>
<td></td>
</tr>
<tr>
<td>&quot; es Salaam</td>
<td>147</td>
<td>24,3%</td>
</tr>
<tr>
<td>Oleih</td>
<td>18,65</td>
<td></td>
</tr>
</tbody>
</table>

If we take a total number of households of 30,000 in 1995 and a distribution of land according to a ratio of 66% for residential purposes, 29% for roads and 5% for services, we can then calculate the demand for space in 1995 using different plot sizes.

<table>
<thead>
<tr>
<th>30,000 households in 1995</th>
<th>total</th>
<th>residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>area AVAILABLE with control of flooding area</td>
<td>766</td>
<td>505,5</td>
</tr>
<tr>
<td>&quot; &quot; without &quot; &quot;</td>
<td>1346</td>
<td>888</td>
</tr>
<tr>
<td>area-DEMAND with a plotsizes of 250m²</td>
<td>1136</td>
<td>750</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; 225m²</td>
<td>1022</td>
<td>675</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; 200m²</td>
<td>909</td>
<td>600</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; 175m²</td>
<td>795</td>
<td>525</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; 150m²</td>
<td>682</td>
<td>450</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; 125m²</td>
<td>568</td>
<td>375</td>
</tr>
</tbody>
</table>

(*) This is including the area which is necessary for the embankment of the riverbeds (40 meters wide and a total length of 11 km) within the S.W.-area.

2.0. The Urban development plans for S.W. Port Sudan

A proposal for the spatial restructuring of S.W. Port Sudan is not surprising if we look at the present state of the squatter areas. Before plans for the restructuring of these quarters can be made though (see chapter 3, the next section) we first have to decide on the function of the S.W. area as part of the city Port Sudan. There are several possibilities:

A. The function of the S.W. area can be exclusively residential whereby the inhabitants stay dependant on the primary centre (downtown, CBD) for employment and services. It means a reinforcement of the present centre but also increasing travel time and expenses and connected congestion problems.

B. The area liable to flooding in the S.W.-area (43% of total area) can be controlled, which means that a relatively large area can be added to Port Sudan for residential, employment and service functions. This means a much more compact cityform with its connected advantages, i.e. shorter distances to work and services, a more efficient (and so cheaper) implementation of basic services, a better accessibility of urban services etc.
MAP 3

URBAN DEVELOPMENT STRATEGY

according to BCEOM.

- Existing urban area
- Available land for extension
- C.B.D.
- Secondary center
- "Main street"
- Barrier to development

0 2Km
C. A secondary centre can be added in the S.W.-area. This centre can take over some functions of the primary centre for the inhabitants of the S.W.-area, that is trade, urban services, administration etc. A certain dispersion and reinforcement of small and light industry and trade shall be probable and desired. The unmistakeable advantages of this alternative plan are a relief of the primary centre and a stronger self-reliant S.W.-area. Due to a stronger integration of living, working and servicing a reduction in travel time and expenses and a better accessibility of urban services is likely.

A combination of the alternatives A, B and C are also some of the possibilities, as we shall see later on when we'll deal with the urban development plan of BCEOM (3) and the urban development plan of the FUA which will be proposed in this paper. To make a comparison between these two plans possible we'll have to deal with the BCEOM plan first after which the FUA plan will be considered.

The BCEOM urban development plan is not solely a plan for S.W. Port Sudan, but encompasses the whole of Port Sudan. It gives a forecast of population growth and spatial needs for 1993 and 2003. The plan itself contains the following points (see map 3):
- the extension of Port Sudan is directed towards the North and South.
- only save areas, that is areas which are not liable to flooding, will be destined for residential purposes.
- there will be no embankment of areas liable to flooding.
- TWO secondary centres will be planned. One at the north and one at the south side of Port Sudan. The southern secondary centre is located south of the airport and north of the southern industrial area.
- there will be an extension of the southern industrial area in southern direction.

The FUA urban development proposal concerns itself only with the S.W.-area of Port Sudan (see map 2). The plan deals with the spatial restructuring of the S.W.-area of the coming 10 years. The plan contains the following issues (see map 4):
- there will be an embankment of the riverbeds in the S.W.-area.
- the total S.W.-area will be destined for building activities.
- there will be only ONE secondary centre, located between the railway and ringroad.

To make a comparison between the two plans, we have to point out the advantages and disadvantages of both alternatives. These are:
- both plans lead to a more self-reliant S.W.-area due to the existence of a secondary centre. This means an increase in employment opportunities and urban services. In short it means an enlargement of the social-economic base of the area. A secondary centre will most probably reinforce formal and informal trade, business and services.
- the enlargement of the social-economic base of the S.W.-area will lead to an overall rise of incomes of the inhabitants of the area.
- Due to an integration of the functions living, working and services, the accessibility of the last two functions will rise. There will also be a reduction in the travelcosts, which means
PORT SUDAN

future land use

- secondary centre
- class 1
- class 2
- class 3
- class 4
- residential extension

Major Public Facilities

Activities

Other Areas

Infrastructures

Red Sea

Sea
- there will be a relief of the primary centre, which means a decline in congestion.

The above mentioned advantages apply to both the urban development plans, but the strongest to the plan of FUA due to control and addition of the flooding areas, which leads to a much more reduction in travel costs and a better accessibility of working places and services is best achieved by the FUA plan.

Besides the difference in the compactness of the city, there is also a difference in location of the secondary centre between the two proposals. Firstly, the location of the secondary centre between the railway and ringroad is far more favourable for the people living in the S.W.-area. Secondly, the planning of only ONE secondary centre on the proposed location has, on an urban-scale, some advantages, namely:
- the connection with the primary centre and the port is excellent, because of the presence of the railway and the ringroad. A frequent trainservice between the centre and Asotriba-station is one of the possibilities.
- A possible future extension of the airport doesn't interfere with the proposed location of the secondary centre, in contrast with the plan of BCEOM.
- the planning of ONE secondary centre with a railway connection does have more chances and possibilities to attract industrial- and tradeactivities than two dispersed centres (North and South as proposed by BCEOM), which will lead to a dispersion of energy and costs, and no real counterweight to the present primary centre.

The disadvantages of a secondary centre are small in comparison to the advantages, certainly if we look at the long-term effects and a population of Port Sudan of a half million people, but nevertheless they have to be mentioned.
- On a short term the construction of a secondary centre will consume a considerable amount of financial resources, which will be earned back later on through the passing out and selling of plots.
- A new secondary centre demands higher investments, more extensive basic services (water, electricity, industrial- and tradeactivities, garbage collection etc.) and public services (medical, educational and administrative).

This means a substantial demand on the planning and execution departments for available manpower, organisation and know-how.

Another difference between the two plans, as already mentioned before, is the difference in control of the flooding areas. The dis- and advantages are as follows:
- An embankment of the flooding areas saves a substantial area for residential purposes and other activities (43%). In short it means a much more compact city.
- The providing of basic services will be much more efficient and so cheaper due to the compactness of the city.
- The compactness of the city gives a larger financial base of the residents in relation to the provision and accessibility (shorter distances) of basic and public services.
The distances to the primary and secondary centre will be shorter which means a reduction in travel costs and congestion.

An embarkment of the flooding areas with the participation of the inhabitants and the use of labour-intensive methods creates temporary employment and a decline in construction costs.

The BCEOM plan doesn't have these advantages but does on the other hand, give less problems in relation to financial resources and organisation in the short-run. A disadvantage of the BCEOM plan is, with growing population-pressure, the chance of settlement of the unsafe flooding areas which is potentially very dangerous. Another disadvantage is the waste of this relatively big area which has a high potential use-value, due to its short distance from the primary and the proposed secondary centre. A disadvantage of the embankment of the flooding areas is the initial costs, organisation effort and know-how demand, which on the other hand can be reduced by participation of the inhabitants and the use of labour-intensive methods.

Evaluating the before mentioned aspects, we choose, partly because of its longterm and partly because of its balanced perspectives, the urban development plan of FUA. This plan will be the basis of the three restructuring plans for the S.W.-area, which will be laid out in the next chapter.

3.0. The restructuring alternatives for S.W.-Port Sudan.

3.1. Limiting conditions

Before we can formulate some alternatives for the restructuring of the S.W.-area, we have to consider some limiting conditions. These conditions deal mostly with the financial aspects, that is the financial situation of the municipal Port Sudan and the financial situation of the present households in the S.W.-area. These conditions are:

- The shortage of municipal finances for the restructuring of S.W.-Port Sudan.
- The shortage of financial resources of the present inhabitants of S.W.-Port Sudan. They belong to the lowest income categories in Port Sudan.

Besides the before mentioned limiting conditions there is the limiting condition of the achievement of income-redistribution. A spatial restructuring plan can't influence the average income of the people in the short run, but in the long-term it should have some positive influences. This doesn't mean that a spatial plan can reduce the income inequality caused by the production-structure. For this a change in the production relations or a very progressive tax-structure is necessary. Though a certain temporary income redistribution is possible within the limits of a spatial plan. One means is the mechanism of cross subsidies, that is a relatively higher price for a bigger plots size. This means a subsidizing of smaller plots by larger plots. This method of subsidizing will be considered and worked out in the first and the third alternative.
3.2. Some possible ways for a restructuring of squatter settlements.

The proposing of several restructuring alternatives for the S.W.-area is no easy task. There are several aspects which deserve the necessary attention and dedication. The following aspects are considered to be the main points of attention:
1. The physical aspect
2. The income integration/segregation aspect
3. The financial aspect
4. The ethnic aspect
5. The urban services aspect
6. The employment aspect
7. The organisation aspect

All these aspects are more or less connected with each other but represent a different dimension of the restructuring. The differences between the three alternatives will mostly concern the first five aspects and less so the employment and organisation aspect. These last two aspects will be dealt with but won't differ very much between the alternatives.

There are several possibilities concerning the main five aspects for restructuring an area. To begin with the physical aspect, there is a possibility of:
- upgrading, this means an maintaining of the existing structure, houses, plotsize and distribution as much as possible
- resettlement, which means a relocation of the households to new site and service areas, after which the deserted areas will be newly restructured (4). This new restructuring and lay-out can take several forms, that is an equal plotsize or different plotsizes can be chosen. It is possible to either choose a uniform plot size or to vary the plot size in the dwelling block or neighbourhood. They can be applied on different geographical scales, that is dwelling-block-, quarter-, community- or townlevel.

The income aspect integration/segregation (that is the mix or separation of different income-categories) is closely connected to the lay-out of plots and level of basic and public services. There is a possibility to choose between homogeneous of heterogeneous dwelling-blocks, quarters or neighbourhoods:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>dwellingblocks</td>
<td>20 plots</td>
</tr>
<tr>
<td>quarter</td>
<td>200 plots</td>
</tr>
<tr>
<td>neighbourhood</td>
<td>1000 plots</td>
</tr>
</tbody>
</table>

This means that only households belonging to the same income category are allowed to settle together in a dwelling-block, quarter or neighbourhood, or the other way around, that is there will be NO income-selection (=heterogeneous). The plotsize with its connected price, works as a selection criterium for different income categories. This is equally true for the level of basic and urban services, because a high level of these services can only be paid by people with high incomes. So it is possible to achieve a certain income build-up of a dwellingblock, a quarter or a neighbourhood.
The financial aspect, which is closely connected to the income and physical aspect, has been dealt with as one of the limiting conditions. However some remarks have to be made. In all the three alternatives there will be a strong reliance on the principle of self-help and participation of the households to make the restructuring affordable. It's not hard to imagine that upgrading is a cheaper alternative in the short run than any resettlement-scheme. Two factors which influence the financial base of a certain area are:

1. the average level and mix of income.
2. the number of people per ha.

Both these factors are influenced by the plotsize, because a smaller plotsize means more people per ha. A mix of different plotsizes means a mix of different income-categories which leads to the possibility of cross-subsidies.

The ethical aspect is an important aspect in relation to the ethnical and religious diversity of the squatter areas. If we choose, for example the upgrading alternative, the existing ethnical situation will hardly be determined or changed. This means an ethnical diversity on neighbourhood-level and some ethnical homogeneity on quarter-level. With a resettlement-scheme it is possible, through the use of a selection mechanism, to achieve a different ethnic build-up of quarters and neighbourhoods.

The urban services aspect is composed of basic services (water, electricity, roads, drainage, sewerage etc.) and public services (health clinics, schools, garbage collection, public transport etc.). The level of services is strongly connected to the financial and income distribution aspects. It has to be in line with the real possibilities of the inhabitants. However space has to be reserved for future extension of urban services. Accessibility is not only determined by the level of services but also by their location (that is a market, a bus station, a health clinic etc.) have to be located in the centre. A remark has to be made about the population density, because a higher population density means a larger financial base and a higher accessibility of urban services.

The employment aspect has to deal with the services, number, location and accessibility of the employment opportunities. The locations of employment are the primary centre, the harbour, the secondary centre, the southern industrial area and the informal trade and industrial activities in the squatter areas themselves. Because the accessibility of employment is one of the most essential aspects for the successfull of a restructuring of the S.W.-area, it won't differ that much between the alternatives.

The organisation aspect is an important issue, because of the participation of the inhabitants which is necessary for the successful implementation of a restructuring plan. Firstly, there has to be a presentation of the plans and alternatives and a debate with the present inhabitants. Secondly, agreement has to be reached, about each person's rights and duties. Thirdly, a time schedule has to be worked out and the municipal institutes and households have to implement the plan. If for example the households have to build schools themselves, this will need a tight organisation on neighbourhood level.
The households do have some experience with community organisations who exist right now in the squatter areas.

3.3. General objectives.

Considering the before mentioned main aspects and possibilities, we can independantly of the chosen alternative, assess some general objectives. These objectives are:

- The restructuring has to benefit the present inhabitants.
- The restructuring has to increase the accessibility to urban services.
- The restructuring should occur in consultation with the present inhabitants.
- The restructuring should stimulate the accessibility to employment.
- The restructuring should be affordable for the present inhabitants, particularly the lowest income groups.
- The restructuring has to limit the ethnic and religious friction to a minimum.
- The restructuring should make a step by step improvement of urban services possible.
- The restructuring has to be implemented with the participation of the inhabitants.
- The restructuring has to stimulate an efficient organisation structure of the inhabitants.

Besides these general objectives there are also some more or less legal and procedural objectives which are needed just as much for a successfull restructuring. These are:

- The restructuring has to give legal status to the present inhabitants.
- The restructuring has to supply a plot to the existing 'owners' as well as to the existing renters.
- The restructuring has to limit speculation.
- The restructuring has to limit pollution and nuisance (noise, bad smell etc.) of factories.
- The planning and implementation of the restructuring has to be flexibel and step by step.

The before mentioned main objectives and limiting conditions form the framework from which the three alternatives can be looked at and judged. Right now we will deal with the three restructuring alternatives. This means that we will first indicate the specific objectives of every alternative, after which a concrete discription of the main issues will follow without loosing ourselves in unneccesary details which will confuse the discussion. Thereupon a discription of the main dis- advantages shall be given. The last paragrap shall give a comparison of the three alternatives related to the main objectives and limiting conditions.

3.4. Alternative I: The upgrading.

The first alternative provides an upgrading of the existing situation with a minimum of disturbance. This concerns the physical aspect as well as the income integration/segregation and ethnic aspects. The specific objectives of the alternative are:

A. The restructuring should demolish a minimum of the existing housing structure in OLEIH, DAR EL NAIM and DAR ES SALAAM. The prime objective of this alternative is to maintain as much as possible the existing patterns of physical aspects, income groups and ethnic composition in the areas.
B. The restructuring should guarantee a good accessibility of urban services and employment. The accessibility of the plots shall be less defined.

C. The restructuring has to secure a reasonable level of urban services and its possible future extension.

To give these objectives its concrete form, it means that:

1. The present layout of plots will be taken as the point of departure, although a minimum plot size of 100 m² with a maximum of 300 m² will be the limit.

2. The road pattern will be maintained mostly, in addition to which some roads will be upgraded to secondary roads (paved, 10 to 12 m width). One primary road will be planned at the north side of Dar el Naim in such a way that it will overlap the embankment of the riverbed between Dar el Naim and Dar es Salaam (see map 5).

3. The urban services will be increased. This means public watertaps (± 3) in every quarter (200 households). On the neighbourhood level (1000 households), there will be a primary school, a well-equipped health clinic and a market place (with electricity and a bus stop) or a shopping-centre.

4. The public transport will be improved and a good connection with the primary and secondary centre, the southern industrial area and the neighbourhood-markets has to be assured. A train connection between the station and the CBD has to be installed and a new station (passenger stop) should be created at the crossing of the ring road and railway.

5. The households of the squatter areas can get a lease of their actual plot size for a period of 20 years. The costs will be calculated per square metre, in addition to which the larger plots will pay a relatively higher price (= cross-subsidies). Besides this opportunity, it's also possible to lease a plot in the new extension areas, especially for the renters, the households who have to be removed and the households who want a bigger plot than 300 m² (including more urban services). The average price per m² plot will be determined by the costs of basic services, combined with a progressive price system, for example for the plots up to 300 m².

6. In every neighbourhood there will be a neighbourhood council which has to organize the garbage collection, the building of the primary school and the maintenance of the public watertaps. The neighbourhood councils will have to be organised along ethnic lines as much as possible. This will benefit the cooperation among the members and limit the ethnic differences.

7. The present open spaces in the squatter areas and the plots left behind by moved households will be used for public services or their future extension, whenever this is possible and whenever they are in the right location. Some households probably shall have to move because of the implementation of basic services and the minimum plot size regulations. These households will be offered a plot in the new extension areas.
The advantages of the upgrading alternative are as follows:
- The alternative can be implemented within a short period of time.
- Because of a minimal disruption of the physical situation, the capital and energy losses will be limited.
- Because of a minimal resettlement of households, the disturbance of existing social and ethnic relations will be small. This alternative takes into account the existing social and physical structure formed by the inhabitants in accordance with their preferences within their limited financial possibilities.
- The plot size is structured by a minimum and maximum norm.
- Because of the application of cross-subsidies and the minimum standard of 100 m² the restructuring will be affordable for the lowest income groups.
- The financial base for urban services in this alternative is larger for the other alternatives due to a higher population density.
- The urban services will be executed in accordance with the preferences of the households.
- The organisation of the inhabitants will be efficient because it will run along existing ethnic lines.
- This plan is the cheapest in relation to the other two alternatives, especially in the short run.
- The plan will ask the lowest planning and implementation strain in comparing the three plans.

The disadvantages of the upgrading plan are the following:
- The accessibility within the quarters of the plots won't be optimal because of the high population density and the preservation of the existing roads system. This roads system will hinder the supply of basic services like water and possibly later, electricity and sewerage.
- This upgrading is a new approach and is not according to actual planning and building norms as applied till now in Sudan. In this sense this plan doesn't fit into the tradition of spatial planning in Port Sudan.
- A possible future upgrading will be very hard, if not impossible. In a way this alternative is a short term solution.
- Because of the minimal municipal strain and costs of this alternative, the inhabitants can look upon it with distrust.
- The execution of the plan will need a flexible hand, due to the need to take the existing situation in account.

3.5. Alternative II: Resettlement according to BCEOM.

The final report of BCEOM gives a discription of the restructuring of Dar el Naim, Dar es Salaam, Oleih and Deim and Inguab, on page 95 and 96. The urban development plan doesn't talk about the embankment of the flooding areas, so only the dry and safe areas will be used for residential purposes. The resettlement will be according to a replacement system, this means that the area asotriba (± 370 ha) will be used for sites and services, after which the inhabitants of Dar el Naim will be settled there (5). Then the area of Dar el Naim will be cleared and used for sites and services and will house the people of Dar es Salaam, Oleih and Deim en Inguab. The deserted areas will
be used for other residential extensions. The operation will take at least 10 years. The total costs are 64.2 million £S. for 20,148 households, which means an average amount of £S. 3.186.42 per household. These costs are based upon the same criteria as new residential areas. This concerns roads, drainage water, electricity, sewerage, in short it means a level of basic services exceeding the first class level. The average plotsize will be 318 m² taking 60% of the area as residential area with the rest used for roads and services (see map 6).

The elaboration of the plan is very limited. A lot of aspects are missing, namely:
- Objectives
- The income segregation/integration aspect
- The ethnic aspect
- A critical approach of the level of infrastructure and urban services
- The organisational aspect
- The employment aspect
- The lease conditions
- An evaluation.

It’s rather strange that the restructuring of an area of circa 90,000 inhabitants gets the attention of only two pages of a final report containing 132 pages. The result is a very brief and insufficient description.

To make a realistic comparison between the three alternatives possible, we will change and add the BCEOM resettlement scheme. Firstly the specific objectives of the alternative will be as follows:
A. The restructuring should encourage the liveability through a diminishing of the population density.
B. The restructuring should take care of a good accessibility of plots, urban services and employment.
C. The restructuring should lead to a segregation of income categories.
D. The restructuring has to stimulate an integration of the different ethnic and religious groups on the neighbourhood level.

In its concrete form the altered alternative will show the following points (see map 7):
1. There will be an embankment of the S.W.-area as pointed out in the FUA urban development plan.
2. The level of basic services, that is water and roads will be cut down to a fourth class level. This means that there will be one primary road from Deim Kuria through Oleih and Dar el Naim along the cemetery to the ringroad. The rest of the area will have public watertaps, but no electricity, drainage or sewerage will be installed.
3. There will be a uniform plot size of 225 m² which will be available for the inhabitants of the squatter areas. However, there will be a selection system which will guide the higher income categories to the new approved residential extension of 1st, 2nd and 3rd class quarters.
PHASE 3

PHASE 2

PHASE 1

RESETTLEMENT

according to BCEOM.

SCALE: 1/50,000

0 0.5 1 Km
ALTERNATIVE II: RESettlement ACCORDING TO FUA.

PORT SUDAN
FUTURE LAND USE

- SECONDARY CENTRE

- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4

MAJOR PUBLIC FACILITIES
- SCHOOLS

ACTIVITIES
- Centre Business District
- industrial
- light industry
- heavy industry

OTHER AREAS
- agro-industrial
- primary road
- secondary road
- power station

HISTORICAL AREAS
- RED SEA
- SEA
4. The admitted households can opt for a plot with a lease of 20 years. All plots will have the same price. There will be no cross-subsidies.

5. There will be an ethnic homogeneous build-up of quarters (± 200 households). To achieve this a selection system will be developed in addition to which different parts of the residential area will be reserved for the different ethnic and religious groups.

6. With regard to the urban services, we refer to alternative I.

7. The public transport will be planned in the same way as alternative I, namely a good connection with the primary and secondary centre, the southern industrial areas and the district markets by buses and trains.

8. Regarding the organisation of the inhabitants, this too will be comparable to alternative I, which means a neighbourhood council and a town district council for the S.W. area.

The advantages of this resettlement alternative are the following:

- The plan fits into the tradition of urban planning in Port Sudan and leads to a structured plot allocation.
- The level of urban services will be according to the preferences of the households.
- The level of organisation will be much more efficient because it runs along ethnic lines on quarter level.
- Plots will be easily accessible, due to a new structured plot allocation.
- A diminishing population density will increase the liveability of the neighbourhoods and also make it possible for other activities (shops, handicrafts) besides residential to take place.

The disadvantages of this alternative are the following:

- This alternative can't be implemented in a quick way and will need a longer period of time than alternative I.
- It will need a larger planning and execution effort than alternative I.
- A large part of the inhabitants (70%) have to be resettled which can lead to a lot of resistance on behalf of the households.
- Due to the destruction of the present housing, a big effort on behalf of the households in these squatter areas will be needed.
- Due to the resettlement of the households there will be partial disruption of the present social-ethnic relations and structures among the people.
- Because of a homogeneous plotsize, the system of cross-subsidies will be difficult to apply.
- Due to a diminished population density the financial base of the area for urban services will be less than in alternative I. This combined with the above mentioned homogeneous plotsize (and price!) and the difficulty to apply cross-subsidies will probably lead to the displacement of the lowest income categories. Higher income households, actually residing in these squatter areas will be attracted to a new plot in other parts of the town where the level of infrastructure and services will be higher.


The A/B zone alternative fits into the present urban planning principles in the way that zone A will differ from zone B with regard to level of urban services, plotsize and -price. Zone A joins the 1st, 2nd and 3rd class norms together, and zone B represents the 4th class standards.
The specific objectives of this alternative are:

A. The restructuring has to offer a variable plot size with its adjoining level of urban services to justify the income diversity in the squatter areas.

B. The restructuring will mean a temporary income redistribution through a subsidization of the smaller plots by larger plots.

C. The restructuring has to create the possibility for a mix of different ethnic and religious groups on district level (200 plots) to increase understanding and integration. This does not exclude a rather homogeneous composition of ethnic and religious groups in the dwelling blocks (20 plots).

D. The restructuring has to provide a good accessibility of plots, urban services and employment.

In its concrete form the A/B zone alternative will show the following aspects (see map 8):

1. The area between the railway, ringroad and southern demarcation will be zone A (± 375 hectare = 27.7% of the total S.W. area). The remaining area (± 975 hectare) that is the area at the eastern side of the ringroad will be zone B.

2. The plot size in zone A will vary from 300 to 400 m² with a lease of 40 years. The costs of a plot will vary from £ 1,000,- to £ 5,000,-. The use of durable material will be compulsory. The plot size in zone B will vary from 150 to 300 m² with a lease of 20 years. The costs will vary from £ 100 to £ 1,000,-. The building with durable materials isn't compulsory but allowed. An income-selection system will be used to guide the higher income groups to zone A and the lower to zone B. The neighbourhoods in zone A and B will be homogeneous with regard to income, because of an homogeneous plot size per neighbourhood. For example in zone A there will be neighbourhoods with solely plots of 300 m² and neighbourhoods with solely plots of 400 m². In zone B the system will be identical, that is there will be districts with an exclusive plot size of 150 m², 225 m² or 300 m². A system of cross-subsidies will be used in zone A and in zone B.

3. The level of basic services in zone A will be higher than in zone B. In zone A every household will have a connection to the water- and electricity system. The level of basic services in zone B will be the same as in alternative I and II. Only the district market will be provided with electricity as well as the primary school and health clinic. Zone A will have a more sophisticated road system, partly because of the presence and location of the secondary centre which needs a good accessibility. Zone B will have the same road system as alternative II, that is one primary road and a few secondary roads.

4. The level of public services will contain, besides the services at the secondary centre (like a towndistrict hospital for the S.W. area with a market and shoppingcentre, offices, municipal administration, a police station, and a bus-station), garbagecollec-
ALTERNATIVE III: THE A/B-ZONE APPROACH.

PORT SUDAN

future land use

secondary centre

- class 1
- class 2
- class 3
- class 4
- A-zone
- B-zone

MAJOR PUBLIC FACILITIES

ACTIVITIES

OTHER AREAS

INFRASTRUCTURES

LEGEND

Note: Map of the Borough of Port Sudan and Surrounding Areas of the Democratic Republic of the Sudan.
tion, primary schools and some health clinics. In zone B the level of public services will be the same as in alternative I and II.

5. With regard to the ethnic aspect, there will be no selection system for zone A. This means the possibility of a heterogeneous as well as a homogeneous build-up dwelling block. In zone B there will be the distinction between ethnic heterogeneous quarters (B1) and ethnic homogeneous quarters (B2). The inhabitants will have the opportunity to choose between a plot in a homogeneous or a heterogeneous quarter, according to their preferences.

6. Both in zone A and B a certain percentage of the plots (± 20%) will be reserved for renters, with a municipal check on the rents to control malpractices.

7. Regarding the public transport, the same standards will be applied as in alternatives I and II, that is a good accessibility of the primary and secondary centre, the southern industrial area and the districts markets.

8. The organisation of the inhabitants will be according to the alternatives I and II, that is the organisation of neighbourhood-councils as well as a town-district council for the S.W. area.

The advantages of this A/B zone alternative are the following:

- The difference in plot size are according to the income diversity in the squatter areas and lead to a structured plot allocation.
- The level of urban services is differentiated as well, corresponding to the financial position of the households.
- The subsidization of the lowest income groups through cross-subsidies is larger than in alternative I (there are no cross-subsidies in alternative II).
- Regarding the ethnic aspect, the households will have the choice to live in ethnic heterogeneous or homogeneous quarter according to their own preference.
- A possible future upgrading of the neighbourhoods will be no problem.
- A diminishing of the population density will increase the liveability in the quarters and the possibility to initiate other activities.
- The organisation structure will be efficient but won't run along ethnic lines in the ethnic heterogeneous quarters.
- The accessibility to the plots within the neighbourhoods will be good, due to a structured plot allocation.
- The mixture of homogeneous and heterogeneous ethnic quarters in a neighbourhood offers the possibility for understanding and integration of these different groups in the future.

The disadvantages of this alternative are as follows:

- This alternative III will need a longer period of time to be executed than alternative I.
- This alternative will need a larger planning and implementation effort than the alternatives I and II.
- Most of the inhabitants have to be resettled which can lead to a lot of resistance on behalf of the households.
- Due to the destruction of the present housing, the capital and energy loss will be rather large.
- The resettlement of the households causes a disruption of the present social-ethnic relations and structures among the people.

3.7. The comparison of the three alternatives.

To compare the three alternatives, we have to relate than to the general objectives and the limiting conditions, as already mentioned in 3.3. The comparison will follow our selected main aspects (see 3.2.). The following table gives an impression of the values of the alternatives in relation to the main aspects.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>I</th>
<th>II</th>
<th>III (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. The physical aspect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- small energy and capital destruction plus a small disruption of the social-ethnic relation structure</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- structured plot allocation plus a diminishing population density</td>
<td>□</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>- good accessibility</td>
<td>□</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>- possibility for future upgrading</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>- correspondence with the present planning practice</td>
<td>-</td>
<td>+</td>
<td>□</td>
</tr>
<tr>
<td><strong>2. The financial aspect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- low costs and a small planning and execution effort, time</td>
<td>+</td>
<td>□</td>
<td>-</td>
</tr>
<tr>
<td>- subsidization of the smallest plots, the lowest income groups</td>
<td>□</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>- financial base of the inhabitants for urban services and plots</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><strong>3. The income differentiation/integration aspect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- the supply of plots according to the income differentiation</td>
<td>□</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><strong>4. The ethnic aspect</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- the spatial limiting of ethnic and religious friction</td>
<td>□</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>- the possibility for understanding and integration</td>
<td>□</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><strong>5. The urban services aspect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- the increase in urban services</td>
<td>□</td>
<td>□</td>
<td>+</td>
</tr>
<tr>
<td>- the increase in spatial accessibility of the urban services</td>
<td>□</td>
<td>□</td>
<td>+</td>
</tr>
<tr>
<td>- the physical possibility of a step by step improvement of urban services</td>
<td>□</td>
<td>□</td>
<td>+</td>
</tr>
<tr>
<td><strong>6. The employment aspect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- the accessibility of employment</td>
<td>□</td>
<td>□</td>
<td>+</td>
</tr>
<tr>
<td>- the stimulation of employment</td>
<td>□</td>
<td>□</td>
<td>+</td>
</tr>
<tr>
<td><strong>7. The organisation aspect</strong></td>
<td></td>
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<tr>
<td>- the stimulation of an efficient organisation of the households</td>
<td>+</td>
<td>+</td>
<td>□</td>
</tr>
</tbody>
</table>

(*) + positive
□ middle positive
- negative.
Overlooking the complete situation, alternative III followed by alternative I are the most promising alternatives. This is not surprising, considering the costs involved for alternative III and its planning and execution effort. However, one has to take into account the impossibility to add all the scores, partly because the main aspects are subsidized into 1 to 5 headings. Therefore one has to look at all the criteria separately and the choice for one of the alternatives (or a mix of two of them) depends on the weight or value ascribed to the different aspects (criteria).

Considering a mix of the three alternatives, there is the possibility of a combination of alternative I and III. This means an upgrading of the existing squatter areas and the assigning of the extension areas on the east side of the ringroad (that is the areas between and around the squatter areas) to zone B, and the area between the railway and the ringroad will then be zone A. The most important advantage of this alternative is its diversity aspect, that is the range in possibilities. This means for example that it will be possible for every household to achieve a plot in accordance with its income, due to a large differentiation in plotsize and plot-price. The same is true for the ethnic preferences.

It must be clear that several combinations of alternatives are possible to avoid as many advantages of a single alternative and to gain as many advantages of a combination.
The estimates of the present number of inhabitants are very doubtful. This problem will be dealt with in paragraph 1.2.

The figure 6.5% is taken as an average. The expectation is a steady increase of people up to 9% moving to the S.W. area in the first years of the planning and restructuring of the squatter areas (due to information and expectations of increased living conditions. Thus growth will diminish to roughly 4% in the later years when the restructuring will be almost finished.


This resettlement procedure has been initiated before in Port Sudan in relation to the northern area of Port Sudan during the years 1969-1975. It was a 4-phase resettlement of about 40,000 squatters who were provided with a minimum of basic services:

- Security tenure of a plot of 200-250 m² situated in official town extensions in which sufficient open spaces were left for future construction of community centres, schools, mosque, shops, markets and other amenities.

- Public utilities and services, including connections with the city's water supply system (one tap per 150-250 families), surface drainage, garbage disposal and public transport.

- Assistance in re-erecting the original shelters on the designated plots; the original materials such as waste, wood, tins have been used as much as possible, but rags, cardboard, etc. have been replaced.

The whole operation was quite successful, particularly because of:

- The participation of the inhabitants of the deims.

- A realistic assessment of the limits set by the extremely scarce available resources (standards for services and shelter)

- The recognition that normal government procedures are not suitable for dealing with a programme of this nature.

- A well-worked out preparation and quick implementation so as to maintain initial enthusiasm and momentum


However, the area asotriba is already largely an approved residential extension of 1st, 2nd and 3rd class quarters. Strangely enough this is not taken into consideration by BCEOM.
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10. van Garderen (Ton)
11. van de Heuvel (Johan)
12. Kamsma (Eric)
13. Kohnen (Ronald)
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